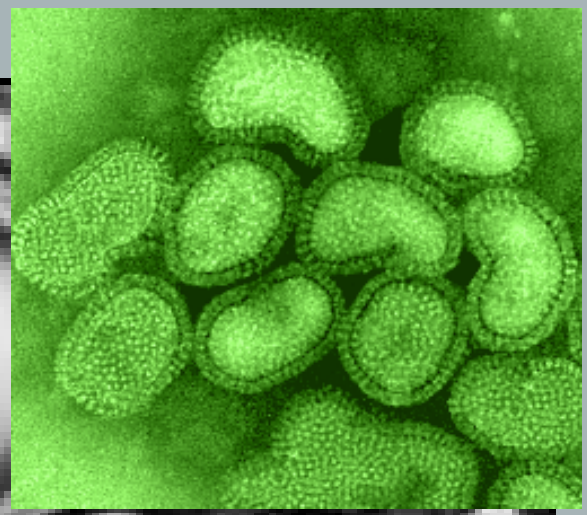
Avian Influenza

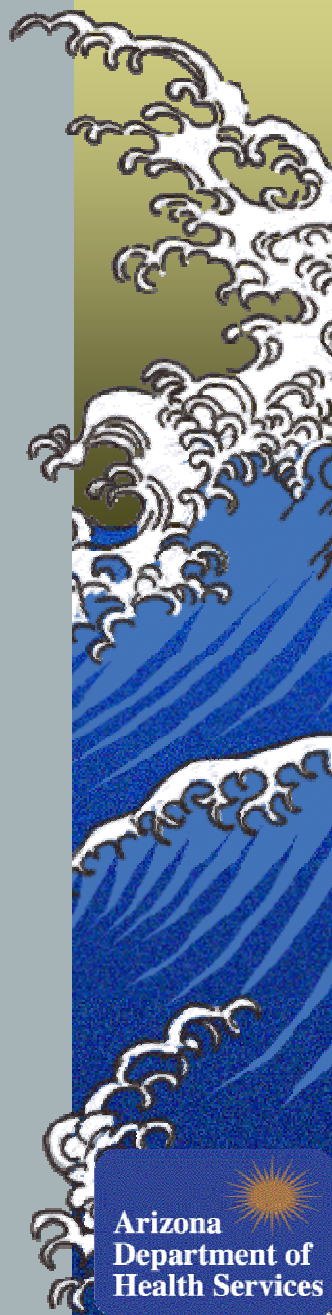


Elisabeth Lawaczeck, DVM

State Public Health Veterinarian

H5N1

- *Still a bird disease, with occasional zoonotic transmission . . .*
- *Human infections remain a rare event.*
- *The virus does not spread easily from birds to humans or readily from person to person*



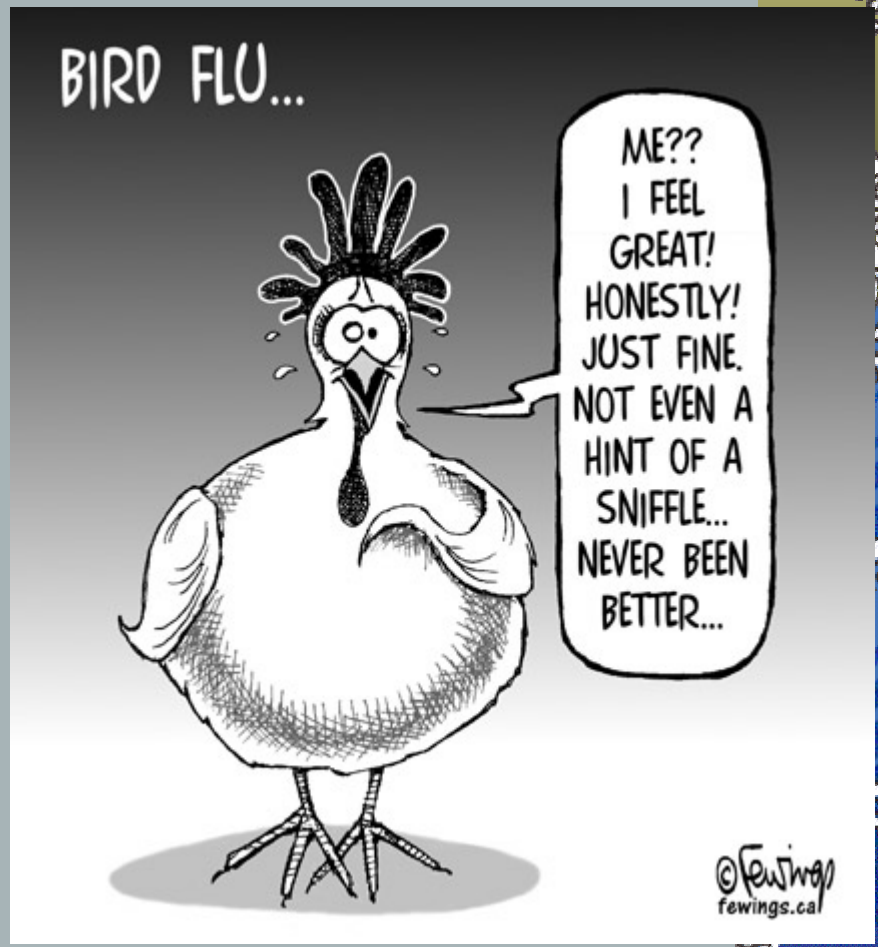
Keeping it in Perspective

- *As public health officials, we should be much more concerned about the Asian form of H5N1 circulating in countries without adequate disease surveillance systems in place, than about H5N1 arriving in U.S.*
- *the largest threat of pandemic flu . . .*
- *International agencies of WHO, OIE, FAO addressing those concerns*

Reasons for Worry

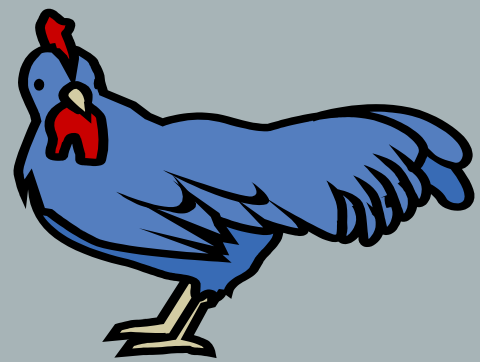
- *David Engelthaler, State Epi of ADHS:*

"If you're feathered, bi-pedal, and oviparous, I'd be a little nervous."



H5NI Dec 2003- Feb 2004 Poultry

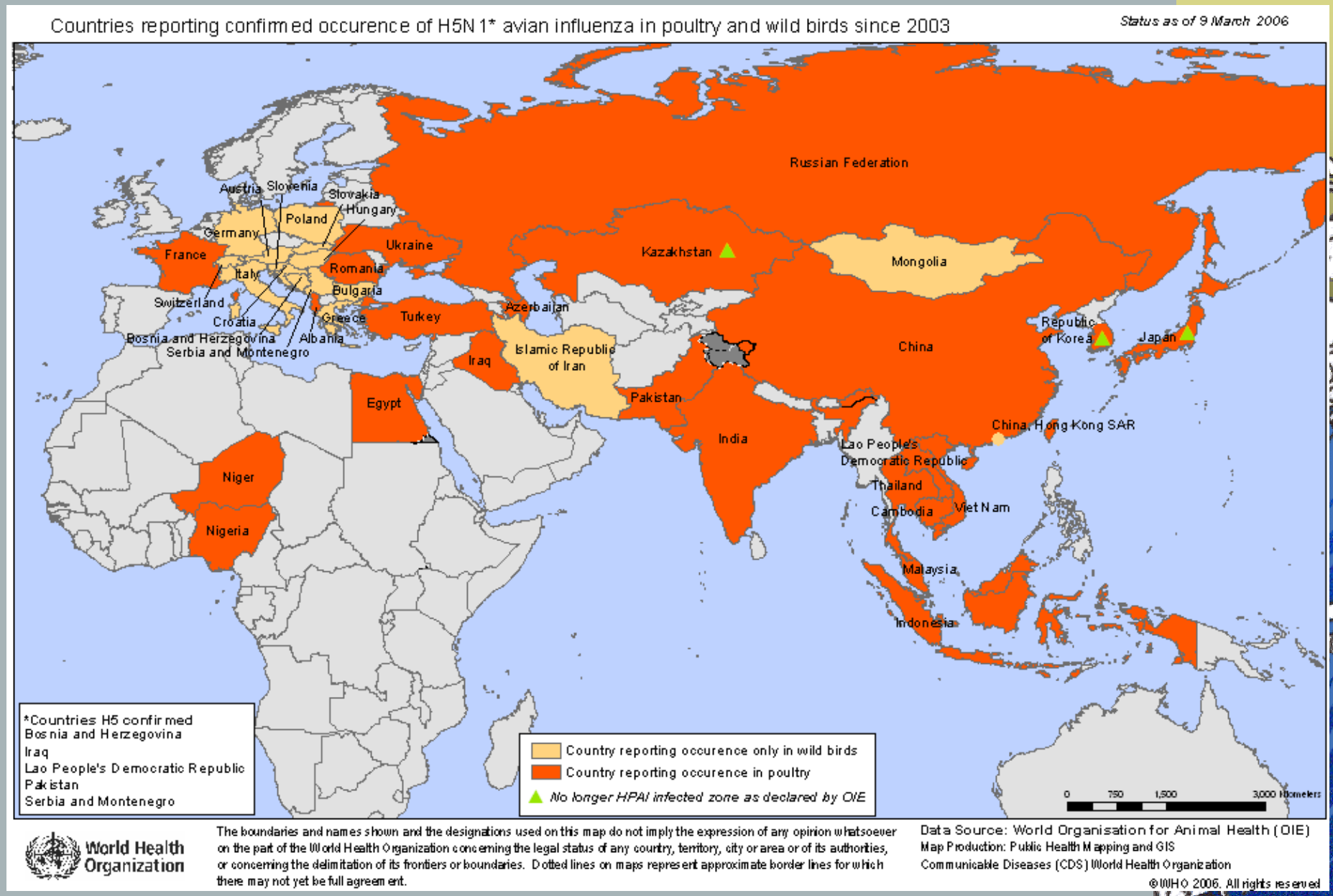
Outbreaks of avian influenza A (H5N1) confirmed among poultry in:



- South Korea * Dec. 2003
- Vietnam
- Japan
- Thailand
- Cambodia
- Hong Kong (in a single peregrine falcon)
- Laos (H5)
- China
- Indonesia

Subsequent Spread

- *Malaysia, Russia , Kazakhstan, Mongolia, Turkey, Romania, Croatia, Kuwait, Ukraine, Iraq, Nigeria, Azerbaijan, Bulgaria, Greece, Italy, Slovenia, Iran, Austria, Germany, France, Hungary, Slovakia, Bosnia-Herzegovina, Georgia, Niger, Sweden, Egypt, India, Switzerland, Serbia-Montenegro, Poland, Albania, Austria, Germany, Mynamar, Denmark, Sweden, Afgahistan, Israel, Pakistan, Jordan*


Countries reporting confirmed occurence of H5N1* avian influenza in poultry and wild birds since 2003
Status as of 9 March 2006
Russian Federation
Austria
Slovenia
Slovakia
Hungary
Poland
Germany
France
Ukraine
Kazakhstan
Mongolia
Romania
Italy
Bulgaria
Switzerland
Croatia
Greece
Turkey
Azerbaijan
Bosnia and Herzegovina
Serbia and Montenegro
Albania
Republic of Korea
Japan
China
Iraq
Islamic Republic of Iran
Egypt
Pakistan
India
China, Hong Kong SAR
Lao People's Democratic Republic
Thailand
Cambodia
Viet Nam
Niger
Nigeria
Malaysia
Indonesia
*Countries H5 confirmed
Bosnia and Herzegovina
Iraq
Lao People's Democratic Republic
Pakistan
Serbia and Montenegro
Country reporting occurence only in wild birds
Country reporting occurence in poultry
No longer HPAI infected zone as declared by OIE
0 750 1,500 3,000 Kilometers
World Health Organization
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.
Data Source: World Organisation for Animal Health (OIE)
Map Production: Public Health Mapping and GIS
Communicable Diseases (CDS) World Health Organization
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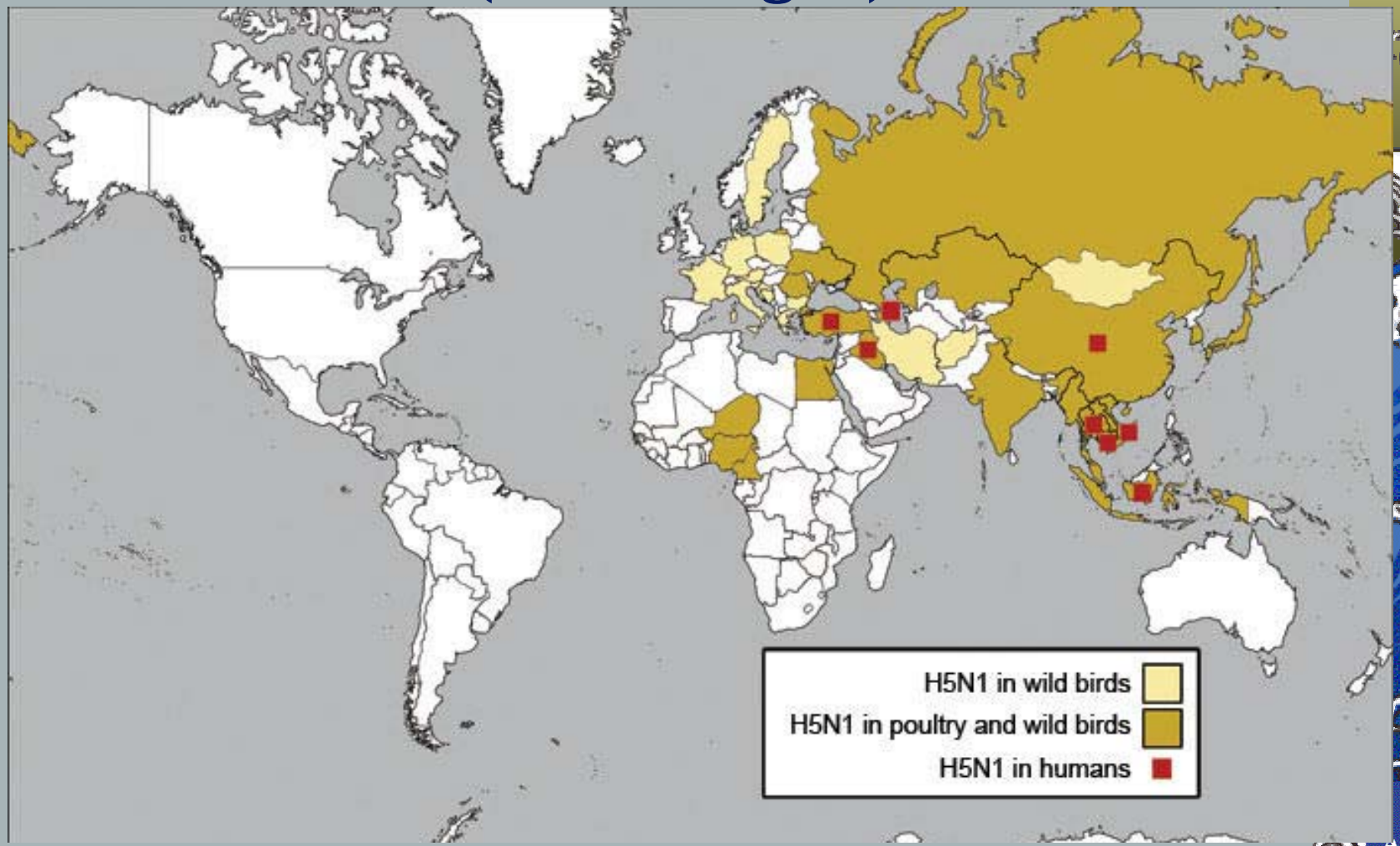
Nations With Confirmed Cases H5N1 Avian Influenza (March 24, 2006) (avianflu.gov)



World Health Organization

H5N1 avian influenza: timeline

24 March 2006

Previous events in Asia

date	animals	humans
1996	Highly pathogenic H5N1 virus is isolated from a farmed goose in Guangdong Province, China.	
1997	Outbreaks of highly pathogenic H5N1 are reported in poultry at farms and wet markets in Hong Kong.	Human infections with H5N1 are reported in Hong Kong. Altogether, 18 cases (6 fatal) are reported in the first known instance of human infection with this virus.
Feb 03		Two cases of H5N1 (one fatal) are confirmed in a Hong Kong family with a recent travel history to Fujian Province, China. A third family member died of severe respiratory disease while in mainland China, but no samples were taken.

21 March 06	**Pakistan** confirms H5N1 in poultry.	**Azerbaijan** confirms its first seven human cases.
23 March 06	*Research*[17,18] Two research groups publish findings that may help explain why the H5N1 virus does not easily infect humans or – like normal seasonal influenza – spread readily by coughing or sneezing. Whereas human influenza viruses attach themselves to molecules in cells lining the nose and throat, avian viruses prefer to bind to molecules located deep in the lungs. Such findings are consistent with the clinical picture of H5N1 infection, in which most patients present with symptoms of infection in the lower respiratory tract, with rapid progression to pneumonia.	
24 March 06	**Jordan** confirms H5N1 in poultry.	Cambodia confirms its first human case since April 2005.

Status of H5NI in Poultry

WHO Timeline: 2nd & 3rd Wave

(domestic poultry unless indicated otherwise)

- *June/Jul 2004: China, Indonesia, Thailand & Vietnam report recurrence*
- *August 2004: Malaysia -9th Asian nation affected*
- *October 2004: zoo tigers in Thailand*
- *July 2005- Russia*
- *July 2005- confirmation in 3 palm civets*
- *August 2005 -adjacent parts of Kazakhstan*
- *Deaths of wild birds reported in Russia & Kazakstan*
- *Aug 2005- Mongolia- H5N1 in dead migratory birds*
- *October 2005- Turkey & Romania*
- *Oct 2005 – Croatia – wild birds*

Status of H5NI in Birds
WHO Timeline: 2nd & 3rd Wave

- *Nov 2005: Kuwait, migratory flamingo- First report in Gulf region*
- *Dec 2005: Ukraine, in domestic birds*
- *Feb 2006*
  - *Iraq, backyard flocks – AFTER 1st human case reported*
  - *Nigeria, in chickens: First detection in Africa*
  - *Azerbaijan, Bulgaria, Greece, Italy, Slovenia, Iran, Austria, Germany, France, Hungary, Slovakia, Bosnia-Herzegovina, Georgia, Niger, Sweden – wild birds*
  - *Egypt, India – domestic poultry*

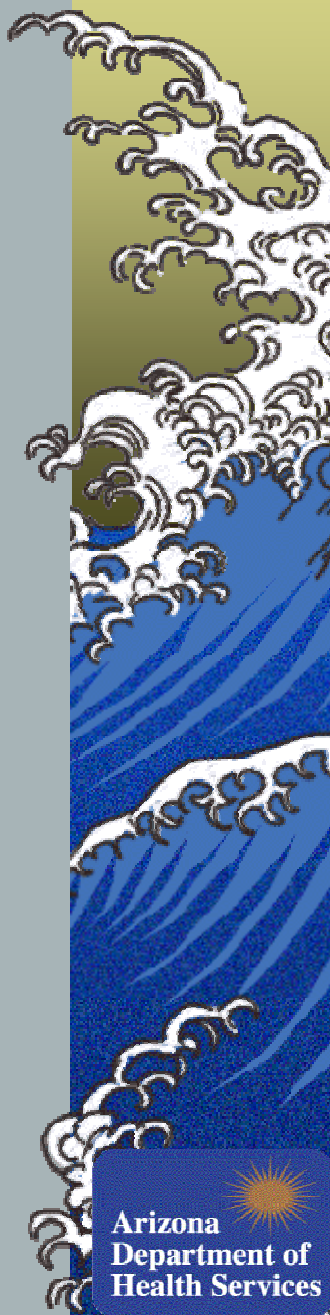
Recent continued spread of H5NI in Birds & Mammals

WHO Timeline: 2nd & 3rd Wave

- *March 2006:*
  - *Switzerland, Serbia-Montenegro, Poland – wild birds*
  - *Albania- poultry*
  - *Austria & Germany– reports in 3 cats each*
  - *Germany- stone marten*
  - *Denmark, Sweden –wild birds*
  - *Afghanistan, Israel, Pakistan, Jordan - poultry*

Eradication Success- Fleeting

- *Japan, Republic of Korea,*
  - *announced control of their poultry outbreaks*
  - *considered free of the disease*
- *In the other affected areas, outbreaks continuing with varying degrees of severity*

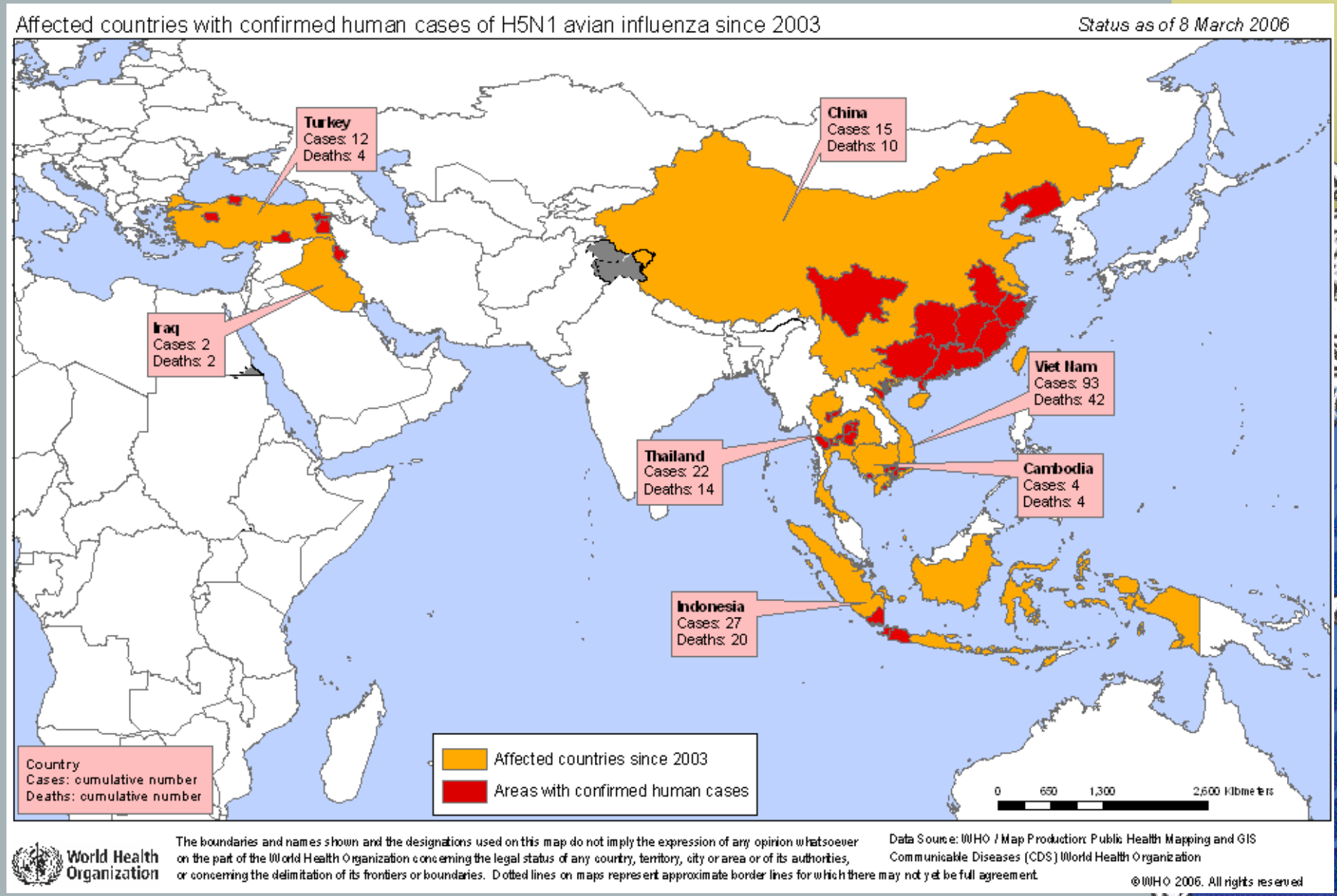


Cumulative Number of Confirmed Human Cases of Avian Influenza A/(H5N1) Reported to WHO (March 24, 2005)

24 March 2006

Country	2003		2004		2005		2006		Total	
	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths
Azerbaijan	0	0	0	0	0	0	7	5	7	5
Cambodia	0	0	0	0	4	4	1	1	5	5
China	0	0	0	0	8	5	8	6	16	11
Indonesia	0	0	0	0	17	11	12	11	29	22
Iraq	0	0	0	0	0	0	2	2	2	2
Thailand	0	0	17	12	5	2	0	0	22	14
Turkey	0	0	0	0	0	0	12	4	12	4
Viet Nam	3	3	29	20	61	19	0	0	93	42
Total	3	3	46	32	95	41	42	29	186	105

Total number of cases includes number of deaths.
WHO reports only laboratory-confirmed cases.


Affected countries with confirmed human cases of H5N1 avian influenza since 2003
Status as of 8 March 2006
Turkey
Cases: 12
Deaths: 4
China
Cases: 15
Deaths: 10
Iraq
Cases: 2
Deaths: 2
Viet Nam
Cases: 93
Deaths: 42
Thailand
Cases: 22
Deaths: 14
Cambodia
Cases: 4
Deaths: 4
Indonesia
Cases: 27
Deaths: 20
Country
Cases: cumulative number
Deaths: cumulative number
Affected countries since 2003
Areas with confirmed human cases
0 650 1,300 2,600 Kilometers
World Health Organization
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Data Source: WHO / Map Production: Public Health Mapping and GIS
Communicable Diseases (CDS) World Health Organization
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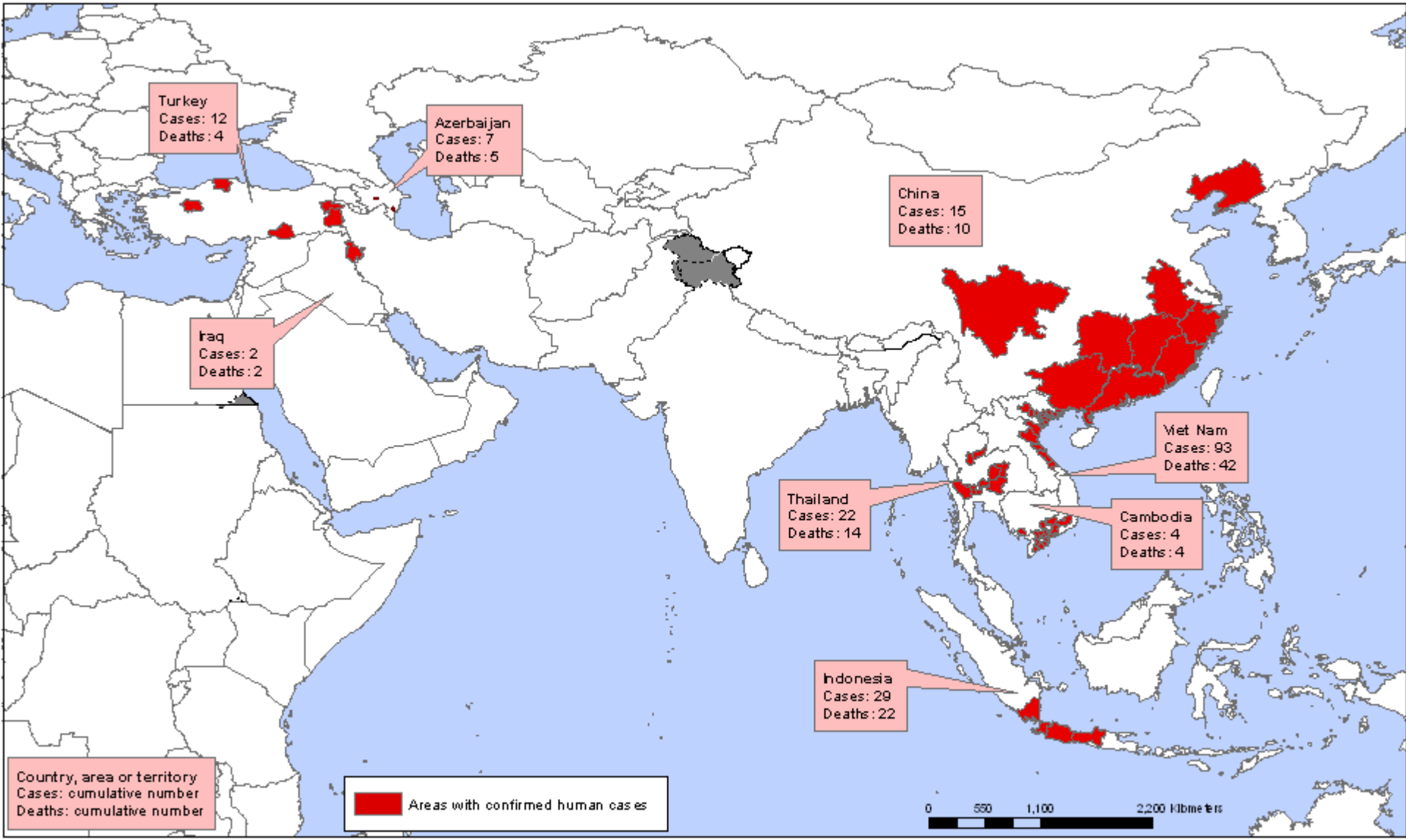
Affected areas with confirmed human cases of H5N1 avian influenza since 2003

Status as of 21 March 2006



World Health Organization

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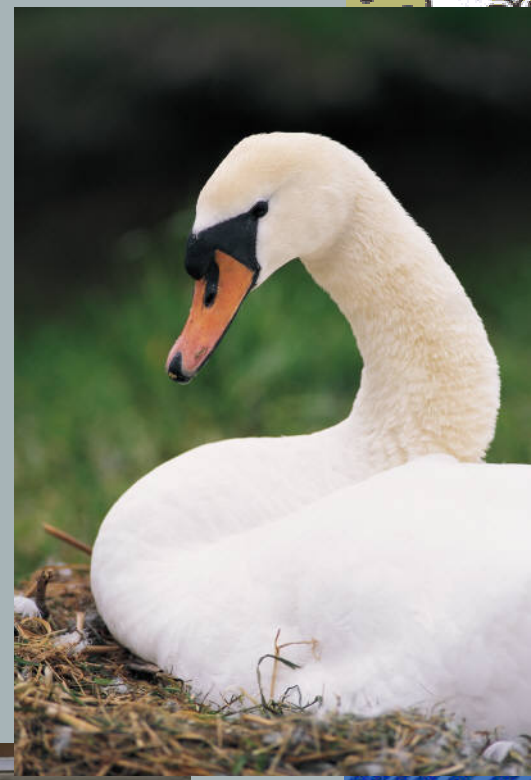
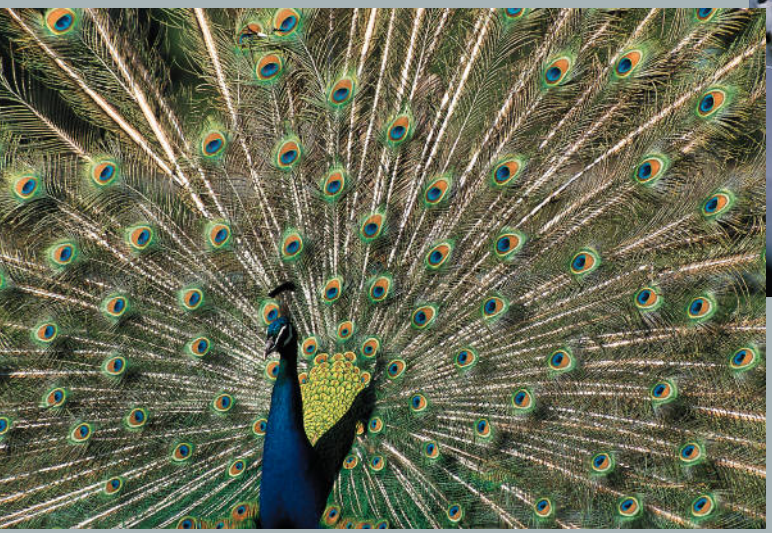
Avian Influenza Panel



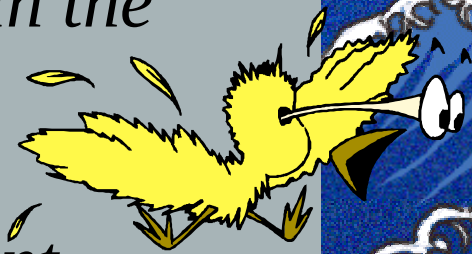


Avian Influenza Wrap Up

- *What's different about this outbreak?*
- *AI in Asia vs. AI in U.S.*
- *Food Safety Concerns*
- *Avian flu & West Nile virus- dead bird reporting from public at county health departments*

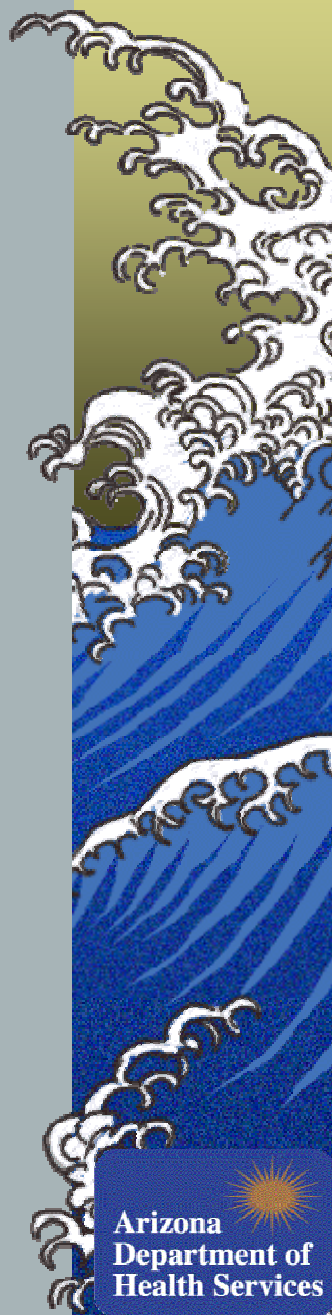
H5NI in Poultry

- *Highly pathogenic AI*
- *Unprecedented outbreak – so many countries affected at same time by same virus*
- *In Jan & Feb 2004 >100 million birds died or culled in Asia*
- *Greater than total # of poultry affected in the world's previous five largest outbreaks combined*
- *Therefore, huge viral load in environment*



CONCERN WITH AVIAN H5N1

- *Despite death/destruction of 100's of millions birds, H5N1 is now considered endemic in:*
  - *many parts of Indonesia & Viet Nam*
  - *some parts of Cambodia, China, Thailand*
- *Control of the disease in poultry is expected to take several years*
- *Large viral load, delay in eradication- may provide opportunity for H5N1 to mutate so that easily transmissible between humans*



AI in Asia vs. AI in U.S.

- *Live bird markets*
- *Families living with poultry*
- *Raise or buy at market*
- *Slaughter to gutting to preparation to table*

Office of Infectious Disease Services

Arizona Department of Health Services

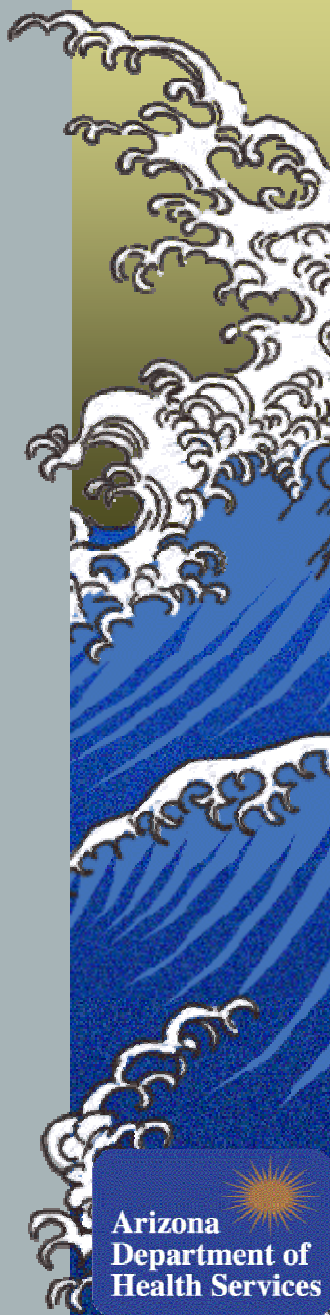

AFP

Avian Flu in U.S.

- *Most of us buy chicken meat at grocery or precooked only*
- *Backyard poultry- not truly living with the birds, as in Asia*
- *Eating of raw poultry products not a custom in U.S. (e.g. family cluster of avian flu in Asia- raw duck blood soup)*
- *USDA has system in place to respond to FADs*
- *USDA has successfully eradicated AI several times in past*
- *Import restrictions of poultry and raw poultry products from affected areas into U.S.*
- *<u>Therefore: no reason to panic if H5N1 in birds reaches U.S.</u>*

Food Safety Issues

- *As always, consumption of raw eggs or undercooked chicken meat – not recommended*
- *"no epidemiological evidence to indicate that people have been infected with the H5N1 virus following consumption of properly cooked poultry or eggs"*
- *Conventional cooking will inactivate H5N1*
- *Eggs can contain H5N1 on shell and inside; eggs from H5N1 outbreak areas should not be used in food that will not be cooked, baked or heat-treated*
- *(above from World Health Organization)*



Barriers to AI in food manufacture

Farm

- *HPAI - visible illness; flocks destroyed*
- *LPAI - focus on H5, H7*

  - destroyed

Processing plant

- *AM/PM inspection*
- *Zero tolerance for feces*
- *Discard - head, trachea, lungs, intestines*
- *carcass wash*
- *Cooking – ready-to-eat products*

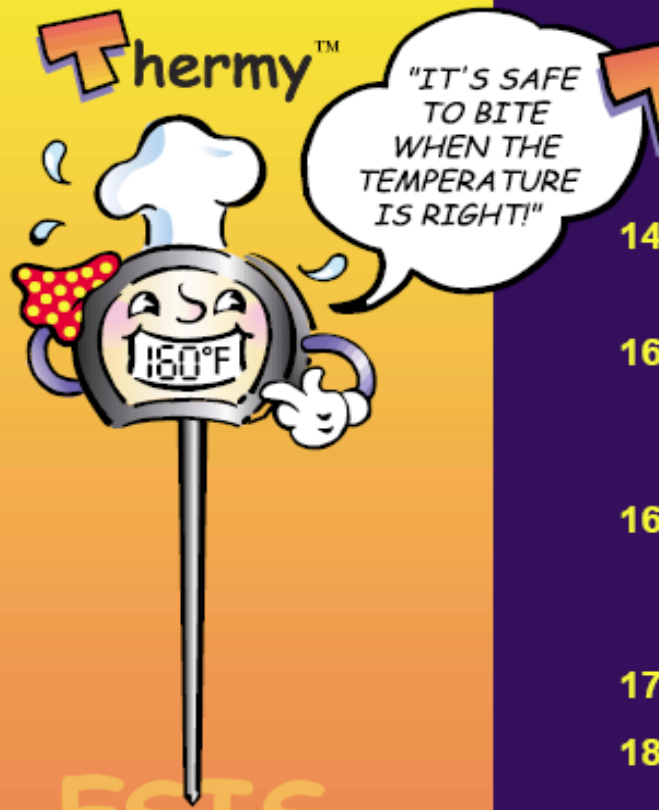
Adapted slide from Kristin G. Holt, DVM, MPH, Office of Public Health Science, USDA, FSIS

Barriers to human infection during meal preparation and consumption

- *The presence of live AI virus in or on food in the U.S. is an uncommon event*

- *WHO website, "…good hygiene practices during handling of raw poultry meat and usual recommended cooking practices for poultry products would lower any potential risk to insignificant levels."*


FIGHT BAC!
CLEAN
Wash hands and surfaces often.
SEPARATE
Don't cross-contaminate.
CHILL
Refrigerate promptly.
COOK
Cook to proper temperatures.
BAC
Keep Food Safe From Bacteria
TM



Temperature Rules!

... for cooking foods at home.

145 °F	Beef, lamb & veal steaks & roasts, medium rare (medium—160 °F)
160 °F	Ground beef, pork, veal & lamb Pork chops, ribs & roasts Egg dishes
165 °F	Ground turkey & chicken Stuffing & casseroles Leftovers
170 °F	Chicken & turkey breasts
180 °F	Chicken & turkey whole bird, legs, thighs & wings

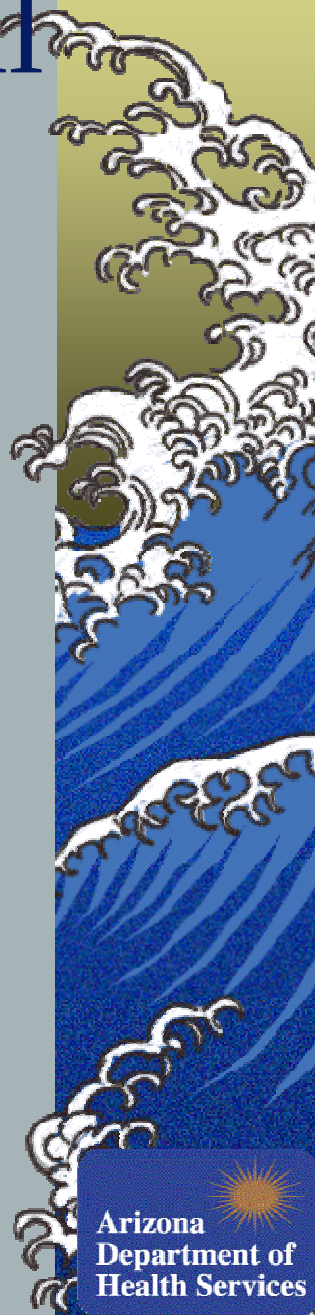
FSIS

Food Safety and Inspection Service
U.S. Department of Agriculture
www.fsis.usda.gov
E-mail: mphotline.fsis@usda.gov

USDA Meat and Poultry Hotline
1-888-MPHotline (1-888-674-6854)
TTY: 1-800-256-7072

Conclusions on Food Safety & AI

- *In the U.S.- barriers to human infection lie in food manufacture and in proper food handling and cooking*
- *ADHS Office of Environmental Health webpage on avian flu and food safety: soon available at www.azdhs.gov*
- *WHO document on Food Safety: www.who.int/csr/disease/avian_influenza/en*



Expanded Host Range

- *H5N1 appears to have expanded its host range, infecting & killing mammalian species previously considered resistant to infection with avian influenza viruses*

Stone Marten *(Martes foina)*

Timeline of (H5N1) avian influenza in cats and other felidae (and civets)	
1970s & 1980s	Research revealed that infection of domestic cats with influenza A subtypes H3N2 from humans, H7N3 from a turkey, and H7N7 from a harbor seal (Phoc vitulina) produces transient virus excretion and a temporary increase in body temperature but did not induce any other clinical signs of disease.
December 2003	Two leopards and two tigers died at a zoo in Thailand after feeding on chicken carcasses. Investigation confirmed H5N1 in tissue samples from all 4 animals. This was the first report of influenza causing disease and death in big cats.
September 2004	Research shows that domestic cats experimentally infected with H5N1 develop severe disease and can spread infection to other cats.
October 2004	A H5N1 outbreak in zoo tigers in Thailand reportedly fed on chicken carcasses. Eventually, 147 out of the population of 441 tigers died or had to euthanized for animal welfare reasons.
June 2005	Tests on three civets that died late June 2005 in Viet Nam revealed H5N1, marking the first infection of this species with the virus. These endangered Owston's palm civets were raised in captivity; source of infection is still unknown.
October 05 February 06	FAO field veterinarians report unusual high cat mortality in Iraq and Indonesia in the vicinity of H5N1 outbreaks in poultry.
28 February 2006	H5N1 confirmed in a cat on the Baltic Sea island of Ruegen (Germany). Over 100 wild birds had been found dead on the island during previous weeks.

Role of other species?

- *To date, only domestic poultry are known to have played a role in the transmission cycle of the virus from animals to humans*
- *Cat owners in certain parts of Europe have been advised to keep cats indoors*

Concern by Cat Owners

Food and Agriculture Organization of United Nations

Cats and Avian Influenza

● العربية ● 中文 ● español ● français ● italiano

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Animal Production and Health Division

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- Avian Influenza
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  - Background
  - AI Bulletin
  - FAO Response
  - Questions & Answers
  - Disease Card

ANIMAL HEALTH **SPECIAL REPORT**

H5N1 in cats

Introduction

At the end of February 2006 highly pathogenic avian influenza (HPAI), caused by the H5N1 virus was detected in a domestic cat found dead on the northern island of Ruegen, Germany. Since mid-February, over 100 birds have died on this island and tests confirmed H5N1 infection. Also in Asia, cats and other felidae are occasionally found to be infected with H5N1 since the start of the poultry epidemic end 2003. Experimental studies have shown that the domestic cat can become infected with the virus and that cat to cat transmission is possible in principle. Serological studies in several Asian countries suggest that dogs may also contract the H5N1 infection. Countries in Europe have advised owners of pets living near H5N1 wild bird foci to keep cats indoors and dogs on a leash when taken for a walk.

These recent events lead to many questions by the public and pet owners to which the veterinary profession has to respond. In addition, there may be exposure of pet owners and veterinarians. For example, when animals infected with H5N1 (eg birds, dogs and cats) are brought to the veterinary clinic. Important are also the contribution veterinary practitioners can make in the surveillance of the disease for the presence of the H5N1 infection.

This section provides information for the general public and professionals about the risk of cats contracting H5N1 virus and the role of cats in the spread of avian influenza H5N1.

Background back

During a H5N1 outbreak in poultry in 1997 in Hong Kong, the first clinical human cases of this sub-type were reported with several fatalities. From the end of 2003 to date (March 2006) 173 people have been confirmed infected with the H5N1 virus of which 93 have died. Except for 1

Public Calls

Dead Bird Reporting to County Health Departments

- **"County and state health departments are NOT testing birds for avian/bird flu"**
- **State and federal wildlife health officials (USDA APHIS Wildlife Services, Arizona Game & Fish Department, U.S. Fish & Wildlife Services) will be testing wild migratory birds (primarily certain waterfowl) for the Asian H5N1 in only SELECT areas**
- **Wildlife health officials are testing wild migratory birds (NOT backyard domestic ducks and geese & NOT other backyard birds)**
- **Birds submitted for WNV testing, only some will be selected by wildlife health officials and staff at the veterinary lab for AI testing, based on FRESHNESS, bird species, and geographic area**

Public Calls

Dead Bird Reporting at County Health Departments

- **Thank caller for reporting dead bird; Explain to caller that birds will only be tested for WNV**
- **Occasional wild migratory water fowl (ducks, geese, swans) reported by public may be tested, depending on if FRESH, AREA OF STATE, and lesions seen on necropsy (dependent partly on how inside of birds look when examined)**
- **Assessment of whether submitted bird will be tested for AI will be made by wildlife health officials and at the veterinary lab, not at the county our state health department**

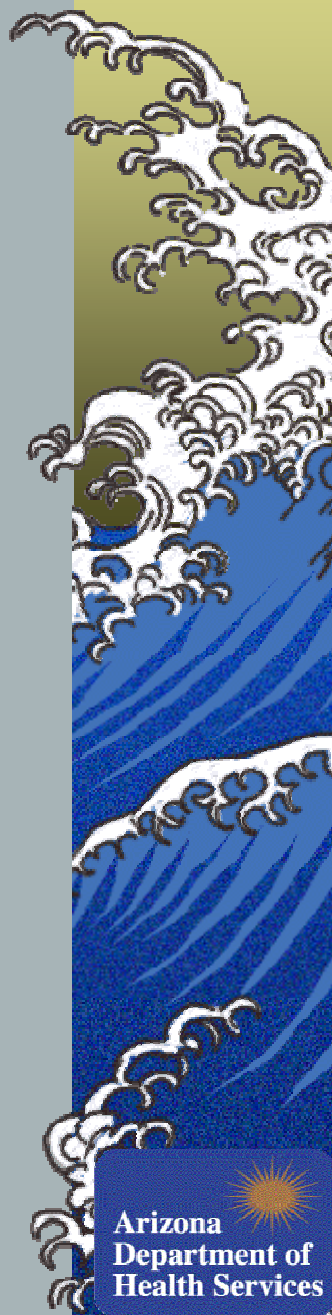
Public Calls

Dead Bird Reporting

- **Reassure public that surveillance for AI is ongoing in poultry and wild birds in AZ, targeted based on current status of AI in world or U.S.**
- **Poultry sickness/die off- advise to call local vet. If not willing to pay for local vet visit & symptoms in poultry are severe: report to Arizona Department of Agriculture Livestock and Poultry Hotline: 1-888-742-5334**

Public Calls

- *ADHS Hotline: 1-800-314-9243, metro Phoenix: 602-364-4500 – option for avian flu and pandemic flu questions, will soon be added*
- *ADHS has link for Q & A on pandemic flu on ADHS home webpage: www.azdhs.gov*



www.avianflu.gov

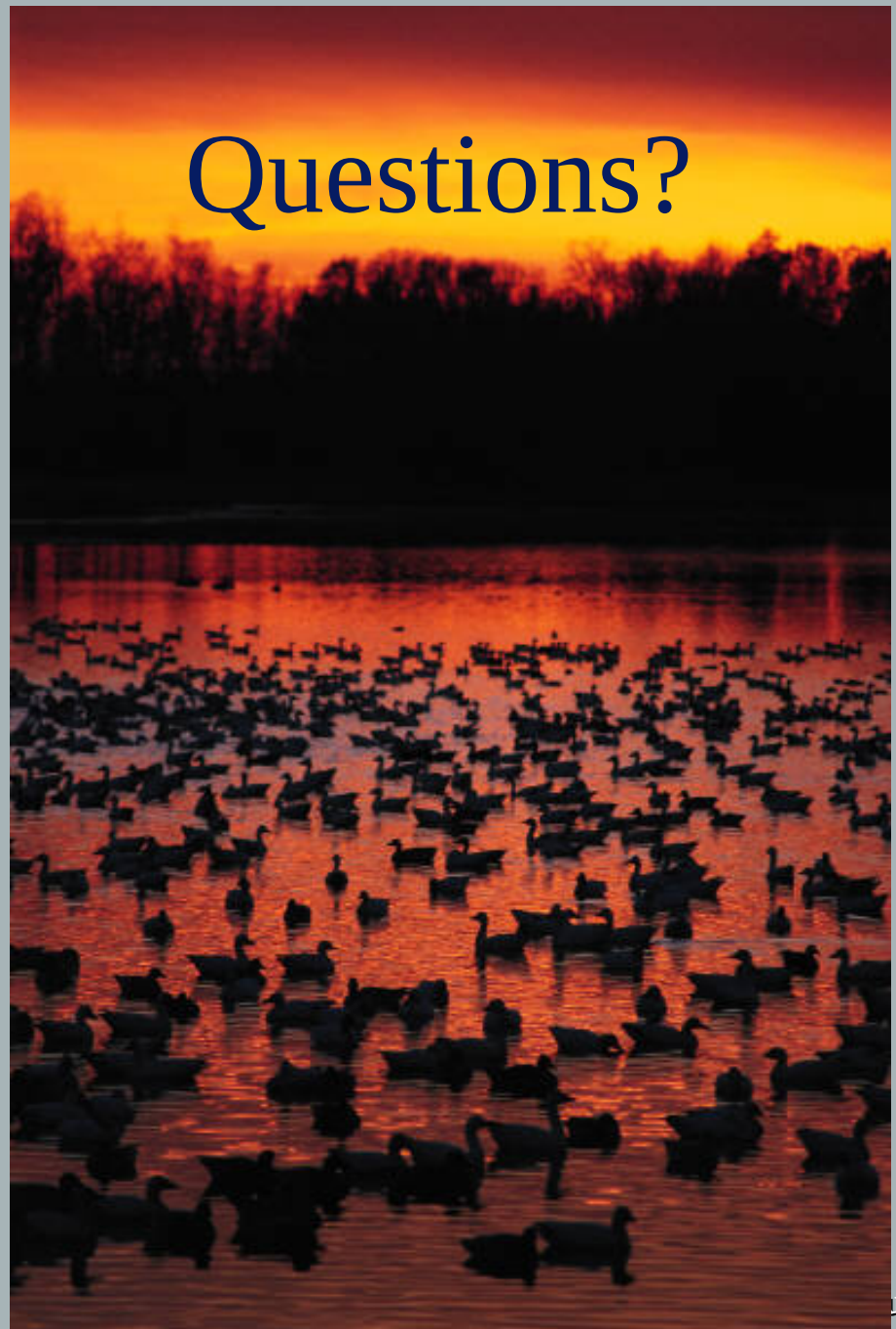
Protecting People Exposed to Animals

- *Avian Influenza: Protecting Poultry Workers at Risk (OSHA)- How employers can provide a safe environment for their poultry workers*
- *Interim Guidance for Protection of Persons Involved in U.S. Avian Influenza Outbreak Disease Control and Eradication Activities (CDC)- How to protect people involved in activities that could result in exposure to avian influenza, such as culling operations, carcass disposal, and cleaning and disinfection of premises*
- *Safety Guidelines for Handling Wild Birds (USGS National Wildlife Health Center)- Advice for the general public, hunters, & field biologists*
- *What Hunters Should Know About Avian Influenza (Alaska State Department of Fish and Game) Safe preparation & cooking of game animals & susceptibility of other animals*

Top 10 Dumb Guy Tips For Avoiding The Bird Flu (From David Letterman show)

- *9. "Don't lick unfamiliar pigeons"*
- *8. "Frighten birds by constantly meowing"*
- *5. "Move to a place where there are no birds, like the moon"*
- *4. "Avoid birds that look like they're up to something"*
- *1. "If you have a chicken, check for swelling in the McNuggets"*

Questions?

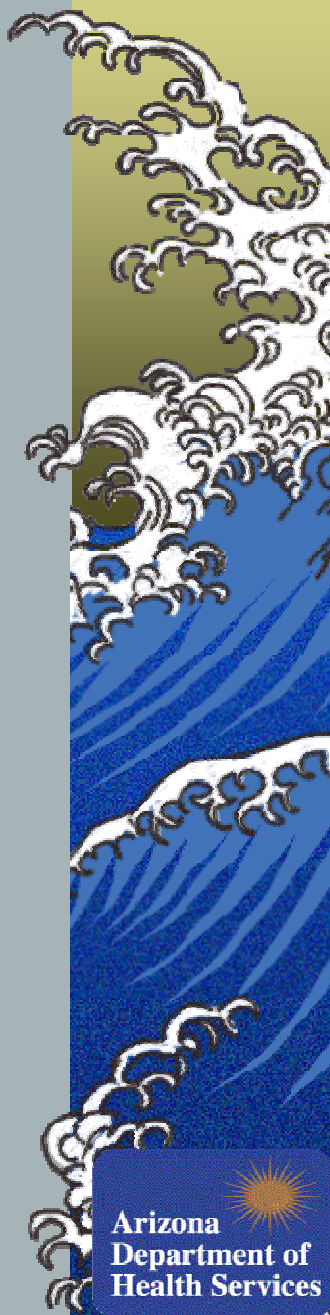


Arizona Department of Health Services

The End

New reasons for concern

- *H5N1 appears to have expanded its host range, infecting and killing mammalian species previously considered resistant to infection with avian influenza viruses*
- *Behavior of the virus in its natural reservoir, wild waterfowl, may be changing:*
  - *Spring 2005 die-off of 6,000 migratory birds @ nature reserve in central China, caused H5N1, was highly unusual and probably unprecedented*
  - *only 2 large previous die-offs in migratory birds, caused by highly pathogenic viruses, are known to have occurred: in South Africa in 1961 (H5N3) & in Hong Kong in the winter of 2002–2003 (H5N1)*

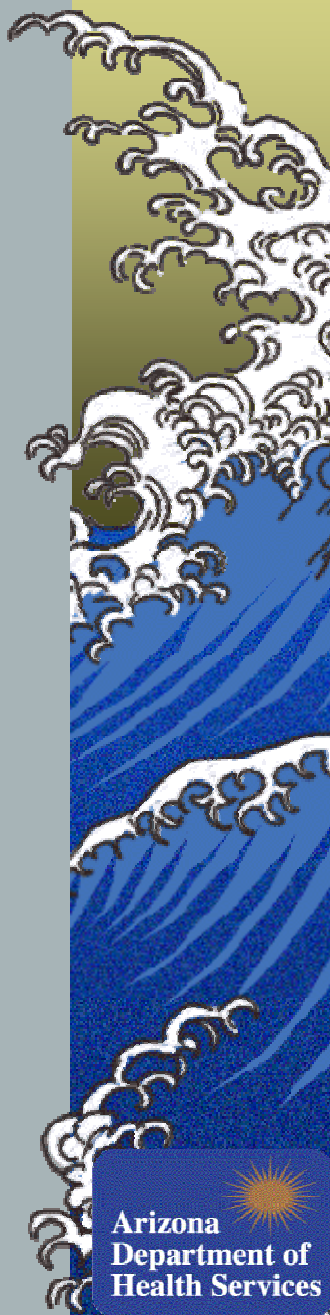


How likely is a pandemic?

- *"It's not a matter of if, it's a matter of when . . ."*
- *A pandemic can start when 3 conditions are met:*
  - *a new influenza virus subtype emerges*
  - *it infects humans, causing serious illness*
  - *it spreads easily and sustainably among humans*
- *H5N1 virus meets 1st 2 conditions:*
  - *it is a new virus for humans (H5N1 viruses have never circulated widely among people); No one would have immunity*
  - *it has infected > 100 humans, killing over half*

How likely is a pandemic?

- *The risk that H5N1 virus will acquire the ability for efficient and sustained human-to-human transmission persist as long as opportunities for human infections occur*
- *These opportunities, in turn, will persist as long as the virus continues to circulate in birds, & this situation could endure for some years to come*



Human Infection w/ Avian H7 Poultry Workers

- *Suspect human infection in VA in 2002 (H7N2)*
  - *antibodies to avian influenza A (H7N2)*
  - *Nasal swabs & other specimens suitable for viral isolation were not collected & therefore virus isolation could not be undertaken*
- *March 2004 reports of avian flu infection in poultry workers in Canada (H7N3)*
- *Conjunctivitis and/or upper respiratory presentation described*

Human Infection w/ Avian H7 Poultry Workers

- *H7N7 outbreak in Netherlands in 2003, caused illness in 83 poultry workers*
  - *79 conjunctivitis, 6 influenza-like illnesses with cough, fever and muscle aches), and 1 patient ARDS & died (in a veterinarian who had visited an affected farm)*
  - *3 possible instances of transmission from poultry workers to family members*
- *risk of infection to poultry workers is low, especially when persons wear appropriate PEP & follow standard depopulation procedures*

CDC Guidance: Individuals Participating in Avian Influenza Outbreak Control & Eradication Activities

- *Such persons often have **prolonged, direct contact** with infected birds and/or contaminated surfaces in **an enclosed setting**.*
- *CDC & USDA have developed guidance to reduce these risks, including recommendations about:*
  - *personal protective equipment*
  - *vaccination with seasonal influenza vaccine*
  - *administration of antiviral drugs for prophylaxis*
  - *surveillance and monitoring of workers*
  - *evaluation of workers who develop a febrile respiratory illness within 7 days of their last exposure*